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would represent the weight of the fluids which leave the body on evaporation at this temperature. The relation

$$\frac{M-P}{M} = q$$

is known as the fluid coefficient and signifies the percentage of fluids in a unit of weight of the living insect body. Experiment shows that the smaller the fluid coefficient the lower lies the normal congealing point of the fluids. The critical point is also influenced by the fluid coefficient, but this influence cannot be stated in general terms till the composition of the fluids has been further studied. Time also influences the critical point. If the temperature (t) to which the insect is undercooled coincides at the same rate of cooling with the critical point (K_1), the juices at once begin to congeal (*i.e.*, time = 0); but if t does not coincide with K_1 , the congealing of the fluids is delayed in proportion to this difference ($K_1 - t$).

Undoubtedly Bachmetjew's results are of a far-reaching character and will ultimately form the basis for important work along theoretical lines in physiology, and for practical applications of great moment (in economic entomology, *e.g.* !), for they throw light on the geographical and climatic distribution of organisms, the resistance of animals and plants to cold and heat, and the problems of anabiosis. That Bachmetjew himself is very sanguine concerning the results that may ultimately flow from his work is apparent when he says. "Es eröffnet sich somit ein ganz neues Gebiet für die Forscher, und wer weiss, ob die Zeit nicht nahe ist, wo man den märchenhaften hundertjährigen Schlaf auch bei Menschen künstlich hervorrufen könnte ! Die Insekten wenigstens bieten die Möglichkeit dazu."

W. M. W.

An Important Paper on Phoridae.—Theodor Becker, of Liegnitz, Prussia, has recently published a work¹ of 100 pages, with five plates, on the family Phoridae, which deserves notice among zoölogists in general because it is one of the finest pieces of systematic work that has been published on the Diptera.

The family Phoridae includes only small species, generally from two to four millimeters in length, which do not offer to the observer with a hand lens a satisfactory series of specific characters. The genus *Phora* was early described and generally recognized from its

¹ *Abhandlungen der k. k. zool.-botan. Gesellschaft in Wien*, Bd. i, Heft 1, 1901.

peculiar venation; this led to the description of a large number of species by the earlier dipterists, among them Meigen, Macquart, Zetterstedt, Bohemann, Haliday, Rondani, and Egger, the types of which ultimately found lodgment in various public museums of Europe. Most, if not all, of these describers based their species chiefly on size and color, having but little comprehension of the real specific distinctions. When they came to identifying each other's descriptions, confusion was worse confounded, and down to the present time it has been impossible to get the family, which is mostly comprised in the single genus, into intelligible shape.

Mr. Becker secured for study the material contained in twelve public museums of Europe, including all the types now in existence of the earlier descriptions, with a few exceptions. He not only made a thorough study of all these collections, but he has published a full report in this work on the named species and types in each, thus putting the old species in a perfectly clear light and preventing future disputes over alleged types and misnamed species in these collections.

In addition to this material and that in his own collection, Mr. Becker was able to study the collections of some eight dipterists of the present generation, so that his work may fairly be termed exhaustive.

Sixty-five European species of the genus *Phora* are described, of which twenty-two are new. The remainder of the family, as represented in Europe, consists of *Trineura*, three species; *Conicera*, two species; *Gymnophora* and *Metopina*, one each.

The arrangement of the paper is admirable, and includes the following sections: table of genera of the world; structure and characters of the genus *Phora*; analytical table of species; description of species; enumeration of the named species in each of the type collections examined, with the proper status of each specimen; a brief division on biology; other European genera and species; extra-European genera, with their species; index of European species, including synonyms; list of accepted European species; list of extra-European described species in the family, with references; explanation of plates, and table of contents. This will give an idea of the completeness of the work.

The characters used are largely those of the bristles, the "chaetotaxy" of recent writers; without the use of these bristles it would be impossible to write an intelligible description of many of the species. There is no family of flies in which it is more essential.

One might wish to see a more extended notice of the biology of the Phoridae, but as long as we have not yet nearly reached the point where we can extend our classification to the larval stages, it is not improper to allow the natural history of the species to form a separate subject.

This paper will be of great advantage to American workers, as it will enable them to ascertain how far our species are identical with the European, Becker's descriptions being so exact that it will be possible to determine without comparison of specimens, I should judge.

To take up a family that is in a state of chaos and transform it into order and beauty by a single publication is a great achievement, and one not accomplished without long and arduous study. Mr. Becker has produced a monumental work, easily the greatest he has yet attempted, and one which may well be taken as a model by younger entomologists.

J. M. A.

Habits of Insects. — An English rendering of the first volume of Fabre's delightful *Souvenirs entomologiques. Études sur l'instinct et les mœurs des insectes*, though with an exceptionable title and an overburdened title-page,¹ is to be heartily welcomed. It makes accessible to a larger circle some of the early work of a keen inquirer into the faculties of insects. Well and favorably known since 1879, Fabre's observations have instigated similar and successful work elsewhere, and it is only from the philosophical side, Fabre being a rigid opponent to any form of evolution, that his writings are open to hostile criticism.

The volume under notice begins with an account of the habits and life history of *Scarabæus sacer*, and is devoted almost wholly to the higher Hymenoptera, though incidental observations concerning other insects are given.

With due allowance for the many difficulties, the translation is fairly well done. Editorially the volume cannot be considered as altogether satisfactory; the supervision of an entomologist should have precluded the translation of *grillon* indifferently as "cicada," "cricket," or "grasshopper," the almost universal use of "feet"

¹ Fabre, J. H. *Insect Life. Souvenirs of a Naturalist*. Translated from the French by the author of *Mademoiselle Mori*. With a preface by David Sharp. Edited by F. Merrifield. With illustrations by M. Prendergast Parker. London, Macmillan & Co.; New York, The Macmillan Company, 1901. xii + 320 pp., 16 pls.